

1. A device for depositing resist onto a substrate, said device comprising:
a rotatable substrate support comprising a first surface onto which a layer of resist may be deposited;

5 a resist dispenser fluidly adjacent said first surface for depositing said layer on said first surface;

a control fluid supply configured to impart a control fluid onto a portion of said resist that has been deposited onto said first surface such that said control fluid emanating from said supply effects a local change in evaporation rate of said deposited layer of resist; and

10 a controller configured to vary the placement of said control fluid onto said deposited layer of resist to effect a substantially uniform thickness layer thereof.

2. A device according to claim 1, wherein said control fluid supply comprises a fluid dispensing nozzle that is moveable relative to said rotatable substrate support.

15 3. A device according to claim 1, wherein said control fluid supply comprises a plurality of fluid dispensing nozzles.

4. A device according to claim 3, wherein said plurality of fluid dispensing nozzles occupy a substantially fixed location relative to said rotatable substrate support.

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5. A device for depositing a solution on a substrate, said device comprising:
a rotatable substrate support comprising a first surface onto which a layer of solution may be deposited;

25 a solution dispenser fluidly adjacent said first surface for depositing said layer on said first surface;

a fluid supply configured to impart a control fluid onto a portion of said solution that has been deposited onto said first surface such that said control fluid emanating from said fluid supply effects a local change in evaporation rate of said deposited layer of solution; and

a controller comprising:

30 at least one detector configured to sense a parameter corresponding to said control fluid; and

a feedback apparatus responsive to said detector such that upon a deviation between said sensed parameter and a predetermined reference, said controller adjusts said fluid supply to reduce said deviation.

- 5 6. The device of claim 5, wherein said support is a wafer chuck.
7. The device of claim 6, wherein said fluid supply comprises an airflow supply.
8. The device of claim 6, further comprising a humidity supply configured to humidify
10 airspace adjacent said wafer chuck.
9. The device of claim 6, further comprising a temperature supply configured to adjust temperature adjacent said wafer chuck.
- 15 10. The device of claim 9, wherein said air supply is configured to impart airflow onto a predetermined substrate location in a substantially vertically downward direction.
11. The device of claim 5, wherein said controller is configured to operate in a plurality of modes comprising a substantially automated mode and a manual mode, the second of which
20 permits said controller to be additionally responsive to an operator input.
12. The device of claim 5, wherein a dispensing nozzle coupled to said fluid supply is moveable relative to said first surface such that said control fluid can be imparted onto different said portions of said deposited solution.
- 25 13. The device of claim 12, wherein said dispensing nozzle and said controller are cooperative such that said dispensing nozzle moves in response to said deviation.
14. A device for depositing a solution on a substrate, said device comprising:
30 a rotatable wafer chuck comprising a first surface onto which a layer of solution may be deposited;

a solution dispenser fluidly adjacent said first surface for depositing said layer on said first surface;

a housing disposed about said wafer chuck such that a substantially controllable environment is formed within said housing;

5 a fluid supply in fluid communication with said substantially controllable environment, said fluid supply configured to impart a control fluid onto a portion of said solution that has been deposited onto said first surface such that said control fluid emanating from said fluid supply effects a local change in evaporation rate of said deposited layer of solution; and

a controller comprising:

10 at least one detector configured to sense a parameter corresponding to said control fluid; and

a feedback apparatus responsive to said detector such that upon a deviation between said sensed parameter and a predetermined reference, said controller adjusts said fluid supply to reduce said deviation.

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15. The device of claim 14, further comprising at least one of an exhaust or drain in said substantially controllable environment.

16. A resist application device comprising:

20 a rotatable wafer chuck comprising a first surface onto which a layer of resist may be deposited;

a dispenser configured to deposit said layer onto said first surface;

a housing disposed about said wafer chuck such that a substantially controllable environment is formed within said housing;

25 a fluid supply fluidly coupled to said substantially controllable environment, said fluid supply configured to impart a control fluid onto a portion of said layer that has been deposited onto said first surface such that said control fluid emanating from said fluid supply effects a local change in evaporation rate of said layer; and

30 a controller configured to vary the placement of said control fluid onto said deposited layer of resist to effect a substantially uniform thickness layer thereof.

17. The device of claim 16, further comprising a detector configured to sense a parameter associated with said control fluid in said substantially controllable environment such that said controller is responsive to said detector such that upon a deviation between said sensed parameter and a corresponding predetermined reference level, said controller adjusts said supply
5 to reduce said deviation.

18. The device of claim 16, wherein said control fluid comprises air.

19. The device of claim 16, wherein said control fluid is a substantially inert gas.

10 20. A resist application device comprising:
a rotatable wafer chuck;
a dispenser configured to deposit said resist onto a generally upper surface of said wafer
chuck;

15 a housing disposed about said wafer chuck such that a substantially controllable
environment is formed within said housing;
an airflow supply fluidly coupled to said resist deposited on said generally upper surface
such that upon impingement of said airflow onto a desired part of said resist, said airflow
produces a localized change in evaporation rate of said deposited resist relative to parts of said
20 resist that are not substantially exposed to said impingement; and

a controller configured to vary the placement of said airflow onto said deposited layer of
resist to effect a substantially uniform thickness layer thereof.

21. A method of controlling the evaporation of solvent from a deposited resist layer, said
25 method comprising:

depositing resist onto a rotating substrate; and

impinging a control fluid onto a portion of said deposited resist prior to curing of said
resist such that said control fluid effects a local change in evaporation rate of said deposited
resist.

30 22. The method of claim 21, further comprising:

sensing an evaporation parameter corresponding to said control fluid;
determining whether a deviation exists between said sensed parameter and a
predetermined reference amount; and
if said deviation exists, adjusting said parameter to reduce said deviation.

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23. The method of claim 22, wherein said sensed parameter is a flow rate of said control fluid.

24. The method of claim 21, wherein said control fluid comprises air.

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25. The method of claim 21, including placing a housing around said substrate to form a substantially controllable environment.

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26. The method of claim 25, including controlling temperature within said substantially controllable environment.

27. The method of claim 25, including controlling humidity within said substantially controllable environment.

20 28. The method of claim 22, wherein said adjusting comprises selectively increasing or decreasing said control fluid impingement.

29. The method of claim 28, wherein said selective increasing or decreasing comprises moving a dispensing nozzle of said supply of control fluid relative to said substrate.

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30. A method of depositing a resist onto a substrate, said method comprising:
configuring a device to comprise:

a rotatable substrate support comprising a first surface onto which a layer of said
resist may be deposited;

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a resist dispenser;

a fluid supply configured to impart a control fluid onto a portion of said resist layer such that said control fluid emanating from said fluid supply effects a local change in evaporation rate of said resist layer; and

a controller configured to vary the placement of said control fluid onto said deposited layer of resist to effect a substantially uniform thickness layer thereof;

placing said substrate on said support;

rotating said substrate;

depositing resist from said dispenser onto said substrate to form said resist layer thereon;

10 and

impinging said control fluid onto a portion of said resist layer to effect said local change in said evaporation rate therefrom.

31. The method of claim 30, further comprising:

15 providing at least one detector configured to sense a parameter corresponding to said fluid supply;

sensing said fluid flow parameter with said detector;

comparing said sensed parameter to a predetermined reference to determining whether a deviation exists between said sensed parameter and said predetermined reference; and

20 if said deviation exists, adjusting said fluid supply to reduce said deviation.

32. The method of claim 31, further comprising providing a feedback apparatus responsive to said detector such that said feedback apparatus performs said adjusting said fluid supply.

25 33. The method of claim 31, wherein said substrate is a semiconductor wafer.

34. The method of claim 31, wherein said control fluid comprises air.

35. A method of forming a resist layer, said method comprising:

30 configuring a device to comprise:

a rotatable substrate support;

a resist dispenser;
a fluid supply fluidly adjacent said support, said fluid supply configured to impart
a control fluid onto a portion of said resist layer such that said control fluid
emanating from said fluid supply effects a local change in evaporation rate
5 of said resist layer; and
a controller comprising:
at least one detector configured to sense a fluid flow parameter
corresponding to said fluid supply; and
a feedback apparatus responsive to said detector such that upon a
10 deviation between said sensed parameter and a
predetermined reference, said controller adjusts said fluid
supply to reduce said deviation;
placing said substrate on said support;
rotating said support and substrate;
15 depositing resist from said dispenser onto said substrate;
sensing said control fluid parameter;
determining whether a deviation exists between said sensed parameter and said
predetermined reference;
if said deviation exists, adjusting said supply to reduce said deviation; and
20 curing at least a portion of said resist.

36. The method of claim 35, wherein said resist is cured by:
subjecting said resist to a first heat treatment;
forming a pattern over said resist to define, upon exposure of said pattern to a source of
25 radiation, a first resist portion and a second resist portion;
exposing said pattern and at least one of said resist portions to said source of radiation;
removing one of said first or second resist portions; and
subjecting the portion of the remaining resist portion to a second heat treatment.

37. The method of claim 36, wherein said removing comprises removing the resist portion
that was not exposed to said source of radiation during said exposing.